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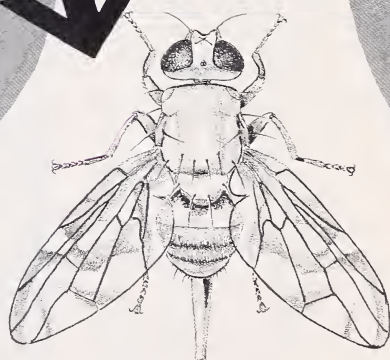
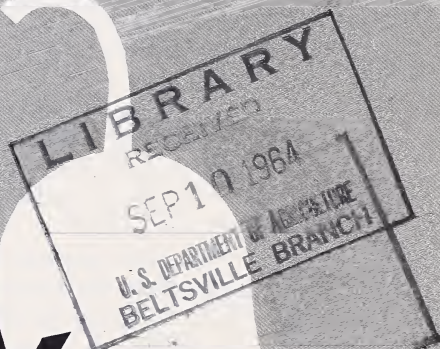
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the MEXICAN FRUIT FLY

how
we
fight
it



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■ The Mexican fruit fly¹ attacks citrus and many other types of fruits. The female lays eggs just beneath the skin of the fruit. The eggs hatch into larvae. The larvae burrow into the fruit, making it inedible.

Each fall large numbers of these flies migrate northward from northeastern Mexico into southern Texas where they infest citrus fruit in the lower Rio Grande Valley. This is the only area in the United States where the insect is active.

In Mexico the fly attacks grapefruit, oranges, mangoes, apples, peaches, pears, pomegranates, quinces, white sapotes, wild yellow chapotes, and other fruits.

In Texas the fly attacks grapefruit, for which it shows a strong preference, and oranges. Few other host plants of the insect are grown in the lower Rio Grande Valley.

All fruit growers should know the facts about the Mexican fruit fly—particularly about the efforts being made to prevent its spreading farther into the United States, and what the consequences would be if it should spread widely despite these efforts.

ORIGIN AND SPREAD

The Mexican fruit fly is native to northeastern Mexico. Originally it attacked wild fruits of no economic importance. When cultivation of mangoes and citrus and deciduous fruits began in Mexico, the fly also attacked the cultivated fruits.

The fly was found in southern Texas in 1927. Here, in the lower Rio Grande Valley, it infests citrus groves in the counties of Brooks, Cameron, Dimmit, Hidalgo, La Salle, Webb, Willacy, Star, and Jim Wells.

¹ *Anastrepha ludens*.

Treatment of infested fruit by Texas shippers before shipment to other parts of the United States has prevented spread of the Mexican fruit fly from the lower Rio Grande Valley. But the insect has spread in Mexico—from the northeastern region to the west coast, and thence northward toward Arizona and California.

In 1953 a well-established infestation of the fly was discovered near Hermosillo, Sonora, Mexico, only 185 miles south of the Arizona border.

In 1954 Mexican fruit flies were trapped in Baja California, Mexico, and in southern California. As a result of these and subsequent findings in the border areas, quarantine and control programs were instituted to prevent the establishment of fruit infestations in these areas. The programs have been highly successful.

LIFE STAGES

The Mexican fruit fly has four life stages—egg, larva (maggot), pupa, and adult (fly).

The life cycle progresses in this way:

1. The female fly pierces the skin of the fruit with a long, needlelike ovipositor, and deposits 1 to 10 or more eggs in the area just beneath the skin.
2. The eggs hatch into larvae. As they grow, the larvae burrow deeper into the flesh of the fruit, and ruin it.
3. When the larvae mature they leave the fruit, which by that time has usually fallen from the tree. They crawl a short distance, burrow into the soil, and there enter the pupal stage.
4. The pupae change into flies; the flies emerge from the puparia and work their way to the surface of the soil.

The periods required for hatching of the eggs and for completion of the

larval and pupal stages vary with the temperature, variety of fruit, and other conditions. The shortest period in which the egg-to-adult cycle is completed is about 32 days. The insect may produce four to six generations a year.

APPEARANCE

The flies are beautifully colored. They have yellowish-brown bodies and their wings are banded with yellow and brown. They are larger than house flies.

The larvae are white and have tiny black mouth hooks at the pointed end. They are legless; they move by expanding and contracting the body segments.

HABITS

The flies do not injure sound fruit, but they feed on the juices from fruit that has already been injured. The larvae do all the damage. One larva in a fruit makes it unfit for food.

The flies can migrate over a large area. They are known to fly 75 to 150 miles from northeastern Mexico to southern Texas. Eggs and immature larvae can survive in fruit shipped over long distances.

As long as host plants are available, the flies can adapt themselves to a variety of conditions. They can withstand freezing weather. They can live in dry or rainy regions, and in mountains or in coastal plains.

The annual migration into southern Texas normally begins in late fall and continues through the winter and spring.

Fly populations build up in January, and peak populations are reached in late March and early April.

Flies infest fruit as long as it remains on the trees. Ordinarily the crop in the lower Rio Grande Valley is

moved by June 15, and few mature fruits occur in the Valley until the next citrus season. Without host fruits, the female flies have nowhere to lay their eggs, and the fly population decreases greatly.

INFESTATION SIGNS

Grapefruit infested by larvae of the Mexican fruit fly take on a light-orange color. There is little else in the appearance of the fruit that serves as a sign of infestation. Infested oranges, however, often develop large brown spots. Each spot shows where larvae have worked within a segment.

Newly hatched larvae are hard to find in citrus fruit, but their presence is indicated frequently by small brown spots in the rag under the skin on each end of the fruit. If such spots are visible, larvae usually can be found within the fruit by cutting off a small part of the ends of the fruit.

PROTECTIVE MEASURES

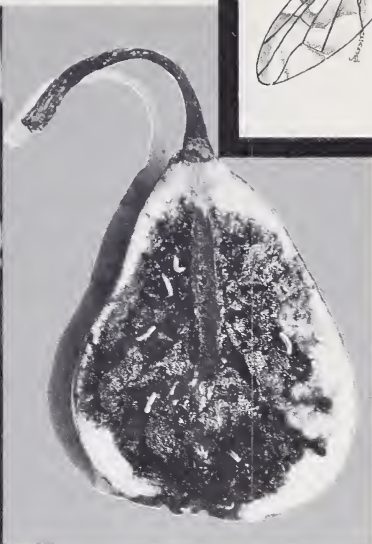
Measures used to fight the Mexican fruit fly and prevent its spread include (1) quarantine and control programs conducted cooperatively by the U.S. Department of Agriculture, co-operating States and the Republic of Mexico, and (2) treatment of fruit scheduled for shipment from the interior of Mexico to the northern parts of Sonora and Baja California, Mexico, and from southern Texas to other host fruit-growing sections of the United States.

Because of the presence of cultivated and native wild hosts in northeastern Mexico, and the fly's migratory habits, no way has been found to keep flies out of southern Texas. Fruit fly traps,



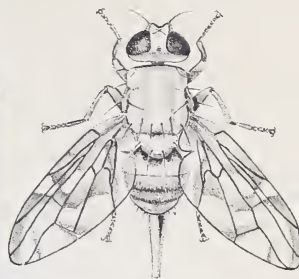
Heavily infested grapefruit

EPQ-1924



Pear damaged by the Mexican fruit fly

EPQ-1925



however, placed in South Texas citrus groves, give a timely warning when the annual fly migration has started from northeastern Mexico, and indicate when the first treatment should commence.

The U.S. Department of Agriculture has developed a rapid, low-cost fumigation method which permits treated fruit to be shipped from the infested area to other fruit-growing sections of the Nation. Although thousands of carloads of fruit have been shipped from the infested area of Texas, the protective measures followed have been so effective that the Mexican fruit fly has not spread outside the quarantined zone.

We cannot prevent the Mexican fruit fly from crossing the international border from northeastern Mexico and infesting fruit in southern Texas. But we are preventing it from establishing infestations in northwestern Mexico, southern Arizona, and California.

In northwestern Mexico there are no wild hosts of the Mexican fruit fly, nor is there any annual fly migration northward. Large quantities of hosts, however, are shipped from the interior of Mexico to the border cities. Some of these hosts are frequently infested. Control measures are necessary to prevent them from carrying live larvae into the uninfested areas of Mexico near the international border.

In the Mexican states of Sonora and Baja California, a cooperative quarantine and control program is in effect. This includes the maintenance of road stations, fumigation of hosts, operation of traps, spraying of groves, and inspection of baggage and parcel post. The program has helped greatly in preventing the establishment of infestations in northern Sonora and Baja California and in southern Arizona and California.



Pupae of the Mexican fruit fly

EPQ-1899



Sour orange damaged by the
Mexican fruit fly

EPQ-1922



Grapefruit damaged by the Mexican
fruit fly

EPQ-1926



Navel orange damaged by the
Mexican fruit fly

EPQ-1923

WHAT COULD HAPPEN

An outbreak of the Mexican fruit fly could occur at any time in the United States, even though all known measures are being taken to prevent this. Chance of an outbreak increases every time a preventive measure is violated, innocently or willfully.

California, Arizona, and Florida are especially vulnerable to attack. If the fly became established in Arizona, in Florida, or in southern California—heart of California's vast fruit-producing section—it probably would cause heavier losses than it does in southern Texas because more varieties of host fruits are grown in these States than in


southern Texas. If the fly became established in citrus sections of these States, it would infest grapefruit more readily than oranges. In the absence of grapefruit, the fly would infest oranges heavily. Peaches and pears would also be favored hosts. In southern Florida, mangoes would be attacked heavily.

Fruitgrowers would suffer extensive losses. In addition, large-scale spraying and sterilization programs, plus rigid quarantine regulations, would affect the entire fruitgrowing operation and increase production costs.

PREPARED BY

Plant Pest Control Division
Washington, D.C.

Agricultural Research Service
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Individual fruitgrowers can help fight the Mexican fruit fly by cooperating with public control agencies. Agricultural authorities, knowing that cooperation is based on understanding, have sought to make clear that the protective measures adopted by the States and by the Federal Government are necessary to prevent the fly from invading some of the most productive fruit sections of the United States.



Larvae of the Mexican fruit fly

EPQ-1893

